Introduction

Minkowski spacetime is a four-dimensional model (4d), an advanced modification of the Galilean and Newtonian classical physics, a configuration in which position of the object is determined by the four coordinates, three spatial and one temporal, named x, y, z, t. Basically, it is a Euclidean plane, or Cartesian system translated into a solid geometry, with additional fourth axis representing the time factor.

In order to project physical environment graphically, various diagrams were presented, like the three mentioned above, but they are only valid locally, inadequate to be used other than in the regional surroundings. With broadening of our cosmic perpective, need for enhancement emerged.

Being a flat model, Minkowski diagram necessarily follows the Pythagorean theorem which expresses the rudimental link between the three sides of a right triangle using formula $a2 + b2 = c2$ implicating that the shortest distance between two points in a spacetime is always the straight line, interval invariance having causality as a distinctive property. It is suitable basis for physical systems over finite distances without the gravitation component included.

If we account for the general relativity then we get a curved rendition yet still an incomplete picture. Introducing Clifford bivector approach, expansion of the scalar/vector field, and Lorentz transformations, six-parameter linear change, we provide a conversion from one inertial frame of reference to the next by enabling rotations (orientation) and boosts (velocity) operations to be performed.

Since dynamics is same in any such frame, Einstein advanced the Lorentz transformations, applying his own principles of physical laws and speed of the light C immutability, eliminating the need for an ether.

Integration of the Lagrangian mechanics into the Minkowski diagram enables analysis of particles motion in a selected system as well as dynamics of an entire field yielding a difference between kinetic (going) and potential (interactions) energy in a form of the Lagrangian function.

$f(L) = kE - pE$

Hamiltonian dynamics refined Langrangian proposition by mapping a vector using momentum, instead of velocity, thus inducing linear isomorphism between tangent and cotangent framework. Besides inertial reference frames, having constant speed, there are also non-inertial ones that

accelerate.

Clifford's spacetime algebra extended the Hamiltonian view joining scalars/vectors, complex numbers and quaternions into a single multivector field which allows bivector state to exist simultaneously.

By now we have deep entered the realm of a non-Euclidean geometry. Gauss, who said that "math is the queen of sciences and number theory is the queen of math", first introduced the term "non-Euclidean geometry" to define all significant efforts made after an initial attempts for creating the universal framework applicable for entire cosmic surroundings not just regional or closed.

Translation

Poincare made further progress adding translation to the symmetry set which, due to the Noether's theorem, necessarily resulted in ten (10) generators being established preserving the spacetime interval and promoting the Hamilton quaternions beyond stationary: 1 for energy (preserved in a closed system), 3 for momentum (constant in a closed system), 3 for angular momentum (conserved in a closed system) and 3 for the middle point of the mass (invariant in a closed system).

Poincaré configuration, named after French mathematician and theoretical physicist Henri Poincaré, is a crucial concept in a modern physics helping us to understand behavior of systems and particles in a spacetime by portraying the basic forces governing the Universe as well as the related conservation laws.

It consists of:

translation (P)

rotation (J)

boost (K)

Translation: change of an object`s position (location) without any influence on its orientation or velocity.

Rotation: change of an object's orientation (direction) without any influence on its velocity or position.

Boost: change of an object`s velocity (speed) without any influence on its position or orientation.

2d3dgraph.jpg (800×812) (jwwb.nl)

Time Transformator

Poincare system is the most complete spacetime framework ever developed. The most complete yet still not perfect. In order to polish it we need to add the time variable into an equation. It doesn't have zero (0) value because it is not a number but a switch factor, buffer, cache, rotadoor of "jor" duration function, sort of a cosmic exchange office. It is only a potential instantly resonating away chronomorphed. Like heated ice doesn't immediately vapourize and skip the liquid state, past does not turn into the future directly nor present moment is an illusion of the self-being. Time streams through the narrow passage of an existence constantly altering between prior and later, before and after, was and will. Past and future events disclose/unfold like

cards pulled from a fresh deck by the hand of an expert dealer and placed on the table having fine green covering stretched over mahagony wood engraved with gold. They just... Stack. 'n Stick. Tick. Tock. Tick. Tock. What is in between tick and tock? Now, we live in between.

Are we the matter or its sorrow emptiness coating? Maybe here as well the sequence is... floating. Slipping perpetually, intangible, elusive.

Alas, we consider space to be vector like, time of a scalar nature. Meaning, space has both directions and attributed values, while time only has an assigned quantity lacking any specific pointing other than... It goes. It passes, second by second, from and in the direction unknown.

Wait! We are observing spacetime solely from the space perspective using triangulation as a practical method having three coordinates to determine an exact position of an object. What if we observe from the time perspective solely? Then physical location becomes irrelevant while time turns into a bivector connecting future and past through a tiny dot called this present moment, now.

Where are we? This question is easy to answer. We are in the Universe, obviously.

But... When are we? Well, this is a lot heavier question than it may appear at a first sight.

What is a future? It is the moment that will happen immediately after now.

What is a past? It is the moment that happened just before the present.

We can not be in the future nor in the past otherwise it wouldn't be referred to as such. We are always in between.

This circumstance was already noticed by theologian Saint Augustine in 4th century CE. In Confessions, he said that "if future does not yet exist, past no longer exists and present takes no time at all then how can time exist?".

Does present exist? There are just two possibilities - it does or it does not.

If present does not exist (takes no time at all) that means that time flow is only an illusion. It is how we perceive reality not how reality actually is.

If present does exist (takes some time) then it is ultrathin, utmostly subtle, practically invisible, infinitesimal line separating the future and the past, quantum sized like single photon is a discrete package of an energy.

I call it "Time Transformator".

Watching the horizon, in the far distance, what is it actually? Is it the edge of the landscape or the first layer of an air above? Or imaginary, illusionary border separating the geosphere and the atmosphere?

We are like the narrow middle section of the sand glasshour having only one

grain width. Up is one grain higher, down is one grain lower. Therefore, it must exist a state which is not up nor down but an equilibrium intermediate. A reference point. Without it you are either up or down which is a paradox because up or down are something which can never be reached. An intangible potential. Just like future or the past.

States, if you are in one then it is not real.

We are now.

Not after or before. Present.

We are here.

Not up or down, left or right, front or back. Right here.

Time is a side-effect of an energy transformation.

Flat ΛCDM Big Bang model

Friedmann–Lemaître–Robertson–Walker metric shows a homogeneous, isotropic and expanding Universe.

David Spergel, in a 2003. study published in The Astrophysical Journal, researched anomalies in the cosmic microwave background (CMB). He discovered that an amounts of positive and negative energy in Universe are equal, canceling each other, meaning the Universe is flat, having total energy zero. If Universe is curved one variable would be higher.

Anton Chudaykin and colleagues observed oscillations in an ordinary, baryonic matter to estimate an arch of the spacetime. The research was published in the journal Physical Review D. They found that the Universe is flat, having a spatial curvature consistent with zero.

Einstein suggests it could be closed meaning after you have traveled for an indefinite time in same direction then you will return to the starting point, in a Mobius strip fashion.

In layman`s terms, the (visible) Universe is a smooth, evenly distributed, dilating, mostly empty structure that originated in the point of an infinitesimal size called the singularity.

Willem de Sitter, who worked with Einstein on spacetime structure, developed simple model of the universe called De Sitter space.

One crazy idea boggles my mind. Space can actully be false 3d if we consider it as a bundle of tightly clinched components having only height and width, no depth. Multidimensional reality is then mere sum of 2d elements. Not like tv and computer screen where 3d is an illusion created on 2d surface. More like quantum holograph set in motion.

Calculus

A logarithmic function is an inverse of an exponential function.

log n (x) = y where x = n`y

The trigonometrics are functions relating an angle of a right-cornered triangle to the ratios of its two side lengths.

Trigonometric functions often used in a geometry are sine, cosine and tangent. Their reciprocals are cosecant, secant and cotangent.

sin (angle) = contrary lenght / hypotenuse

cosin (angle) = touching lenght / hypotenuse

tangent (angle) = contrary / touching

Cosecant, secant and cotangent are reversedly formulated.